

Power Generating Coverings and Casings, Phase II

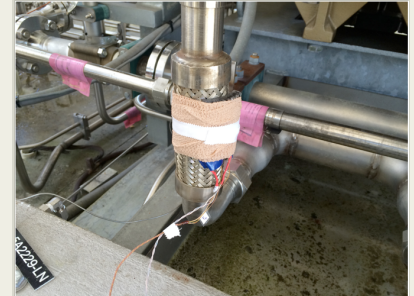
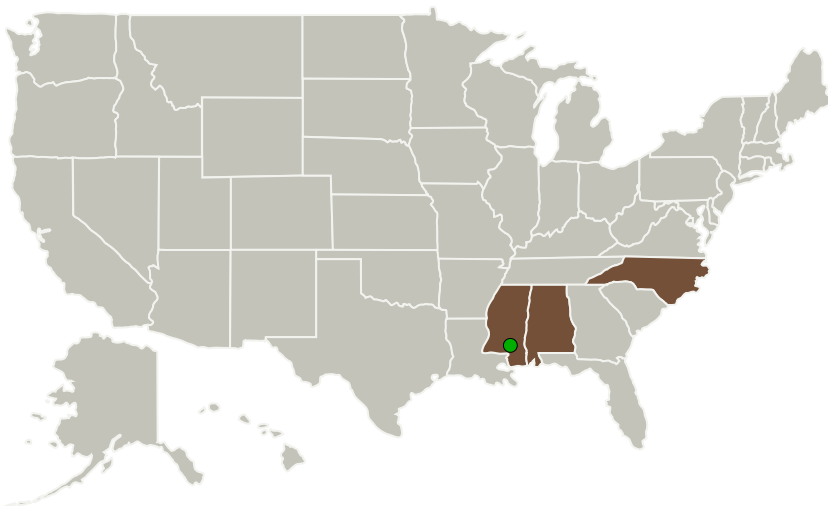
Completed Technology Project (2014 - 2018)



Project Introduction

Advances in structured heterogeneity together with nanomaterials tailoring has made it possible to create thermoelectrics using high temperature, polymer composites. While such thermoelectrics do not have the capability to approach the efficiency of top performing ceramic modules such as BiTe, they do provide two unique aspects of use in energy scavenging: the ability to conform to irregular large shaped areas easily, and the ability to integrate kinetic energy scavenging together with heat scavenging. During Phase I, the group at Wake Forest University demonstrated that the combination of thermal and vibrational power production is actually synergetic –the amount of power generated is greater than the sum of the individual components. This improvement in nanocomposite thermoelectric performance, coupled with effective kinetic energy scavenging makes the piezo-thermo-electric "PowerFelt™" applicable to a wide range of power collection scenarios. Although the goal of making a 1-m² material was not completed, significant progress has been made and this capability will be available in Phase II. A sample of "PowerFelt™" was sent to the National Institute for Standards and Testing for independent testing. Their results confirmed that "PowerFelt™" was significantly better than other power producing films and competitive or better than ceramics that cannot conform to the shape of the heat and vibration source. The material was successfully field tested at the Stennis Space Center at their liquid nitrogen supply facility.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Streamline Automation, LLC	Lead Organization	Industry	Huntsville, Alabama
● Stennis Space Center(SSC)	Supporting Organization	NASA Center	Stennis Space Center, Mississippi
Wake Forest University	Supporting Organization	Academia	Winston-Salem, North Carolina

Primary U.S. Work Locations

Alabama	Mississippi
North Carolina	

Project Transitions

**September 2014:** Project Start**September 2018:** Closed out**Closeout Summary:** Power Generating Coverings and Casings, Phase II Project Image**Closeout Documentation:**

- Final Summary Chart Image(<https://techport.nasa.gov/file/137546>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Streamline Automation, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

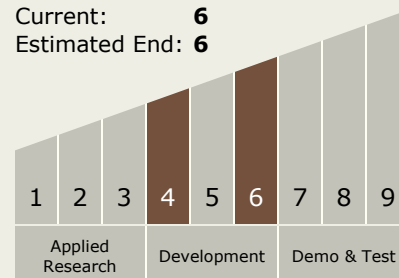
Carlos Torrez

Principal Investigator:

William M Chew

Technology Maturity (TRL)

Start: 4
 Current: 6
 Estimated End: 6

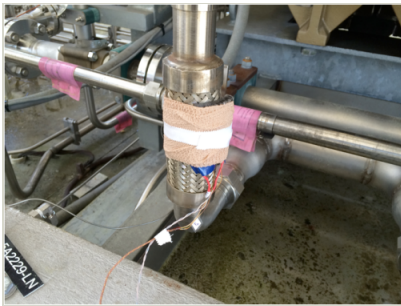


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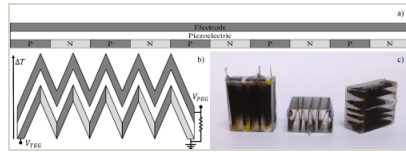


Images



Briefing Chart Image

Power Generating Coverings and Casings, Phase II
(<https://techport.nasa.gov/image/132009>)



Final Summary Chart Image

Power Generating Coverings and Casings, Phase II Project Image
(<https://techport.nasa.gov/image/136878>)

Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
 - └ TX03.1 Power Generation and Energy Conversion
 - └ TX03.1.4 Dynamic Energy Conversion

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System